EXHIBIT 19

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC D/B/A BRAZOS LICENSING AND DEVELOPMENT, *Plaintiff,*	§ §**Case No. 6:20-cv-00958-ADA**
	§
	§ **JURY TRIAL DEMANDED**
	§
	§ § § §
v.	§
ONEPLUS TECHNOLOGY (SHENZHEN) CO., LTD., *Defendant.*	

PLAINTIFF'S AMENDED FINAL DISCLOSURES OF
PRELIMINARY INFRINGEMENT CONTENTIONS

Pursuant to the Court's Order Governing Proceeding – Patent Case ("Order Governing Proceeding"), Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("WSOU") hereby provides its [~~Initial~~]**Amended Final** Infringements Contentions to defendant OnePlus Technology (Shenzhen) Co., Ltd. ("OnePlus" or "Defendant") for U.S. Patent No. 9,231,746 (the "'746 Patent").

WSOU makes this disclosure based on the information presently available to it. Discovery in this case has not started, and WSOU reserves its right to amend or supplement these disclosures as permitted by the Federal Rules of Civil Procedure, by the local rules of the Western District of Texas, and by order of the Court, including the Court's Order Governing Proceedings.

For each Asserted Claim, Plaintiff identifies the following Accused Instrumentalities of which it is currently aware. The identification of Accused Instrumentalities is based on Plaintiff's research and analysis to date, without the benefit of discovery from the Defendant. Plaintiff reserves the right to add, delete, substitute or otherwise amend this list of Accused

Instrumentalities based on discovery or other circumstances, in a manner consistent with the Federal Rules of Civil Procedures, local rules, and standing orders.

The Accused Instrumentalities include, without limitation, the following:

- OnePlus 8 Series Phones (i.e., OnePlus 8 Pro and OnePlus 8) implementing 5G capabilities.
- All past, current and future OnePlus products and services that operate in the same or substantially similar manner as the specifically identified products and services above and described in Exhibit 1.
- All past, current and future OnePlus products and services that have the same or substantially similar features as the specifically identified products and services above and described in Exhibit 1.

Plaintiff's infringement contentions apply to the Accused Instrumentalities as well as all other past, current and future hardware and software products and services developed, made, used, offered for sale, sold, imported, and provided by OnePlus that contain or makes use of the Patented Technology.[1]

Based upon currently available information, WSOU asserts that OnePlus has infringed and/or continues to infringe the patent and claims identified in the attached claim charts (the "Asserted Claims" of the "Patent-in-Suit"). Infringement claim charts evidencing the correspondence between (i) the elements of the Asserted Claims, and (ii) the corresponding items of the accused products are attached hereto. Further, Exhibit 1, which is attached hereto and incorporated by reference, is an exemplary infringement claim chart identifying specifically where each limitation of each Asserted Claim is found within each Accused Instrumentality or practiced by each Accused Instrumentality.

[1] "Patented Technology" means all technologies described in the claims of the Patent-in-Suit.

Accused product	Evidence
OnePlus 8	Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR4X Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4300 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) **Source: https://www.oneplus.com/8/specs?from=8**
OnePlus 8 Pro	Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging **Source: https://www.oneplus.com/8-pro/specs?from=8pro**

Plaintiff asserts that Defendant has directly infringed and continues to directly infringe the Asserted Claims literally through the Accused Instrumentalities by making, using, offering for sale, and/or selling, or importing into the United States the Accused Instrumentalities. To the extent that Defendant alleges that one or more limitations of the Asserted Claims are not literally found in the Accused Instrumentalities, Plaintiff alleges that such limitations are found in or practiced by the Accused Instrumentalities under the doctrine of equivalents. Any differences alleged to exist between any of the Asserted Claims and any of the Accused Instrumentalities are insubstantial and that each Accused Instrumentality also meets each limitation under the doctrine of equivalents as the identified features of the Accused Instrumentality performs substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim limitation. WSOU reserves the right to assert infringement solely under the

doctrine of equivalents with respect to any particular claim element(s), if warranted by discovery,

further analysis, and/or claim constructions in this case.

Plaintiff further asserts that Defendant has indirectly infringed and continues to indirectly infringe by actively inducing infringement of one or more of the claims of the Asserted Patent through the Accused Instrumentalities. Plaintiff also asserts that these third-parties directly infringe at least one or more of the claims of the Asserted Patent through the manufacture, use, sale, offer to sell, or importation of the Accused Instrumentalities.

For example, Defendant has actively induced infringement by encouraging the use of the Accused Instrumentalities in ways that infringe each Asserted Claim**, including, but not limited through providing instructions to its customers and partners to encourage and instruct the user or partner to utilize the accused product in an infringing manner**. Defendant knew or should have known that such encouragement would induce infringement. Defendant has taken active steps with the specific intent to encourage and cause others to use each Accused Instrumentality in ways that infringe each Asserted Claim. Such active steps by Defendant with specific intent to induce infringement have included, among other things, advertising, promoting, marketing, making available for use, offering to sell, and/or selling the Accused Instrumentalities to others; encouraging and influencing others to import, offer to sell, and/or sell the Accused Instrumentalities; directing and instructing others to use the Accused Instrumentalities in infringing ways; and by providing the Accused Instrumentalities to others. OnePlus has performed the aforementioned active steps with the knowledge of the Asserted Patent at least as of the date when the complaint in this case was filed. OnePlus has known or should have known that the acts it has induced constitute infringement because, for instance, it has been aware that end users and resellers will purchase the Accused Instrumentalities will use them, resulting in direct infringement.

Further, for instance, the Accused Instrumentalities are known by Defendant to be

especially made or especially adapted for use to infringe the Asserted Patent, and are not staple articles or commodity of commerce suitable for substantial non-infringing uses. Defendant contributes to the infringement of the Asserted Patent by making available for use, offering for sale, selling, and/or importing the Accused Instrumentalities to third parties, who use the Accused Instrumentalities and/or practice one or more claims of the Asserted Patent. Moreover, Defendant has had notice of the Asserted Patent at least as of the filing of the Complaint in this case.

These Infringement Contentions, including Exhibit 1, are based upon publicly-available information, and Plaintiff's research and analysis to date. The Accused Instrumentalities involve confidential, proprietary designs that are not publicly available, and Defendant has not yet provided discovery. Discovery is ongoing, and Plaintiff anticipates that the subject matter of these infringement contentions will be the subject of expert discovery. Discovery will provide evidence of Defendant's infringement, may lead to the discovery of additional instances of infringement, and may also enable identification of additional claims that are infringed by Defendant. Plaintiff reserves the right to add, delete, substitute, or otherwise further amend these Infringement Contentions based on discovery or other circumstances, in a manner consistent with the Federal Rules of Civil Procedures, local rules, and standing orders. Plaintiff explicitly reserves the right to further modify and/or supplement these contentions with additional or different theories and/or additional or different evidence. Further, WSOU reserves the right to supplement or revise its infringement contentions and/or chart, including identification of additional asserted claims, based on, for example, new versions or variations of one or more of the Accused Instrumentalities that are later discovered.

PRIORITY DATE

Each of the Asserted Claims of the '746 Patent is entitled to a priority date of no later than January 21, 2011. The subject matter described by the Asserted Claims, however, may have been

conceived and reduced to practice prior to this priority date. WSOU also reserves the right to [~~identify~~]**update its contentions with evidence of an earlier conception and reduction to practice through discovery including identifying** any portions of the file history as containing evidence of conception and reduction to practice. Plaintiff's research and analysis is ongoing and Plaintiff reserves the right to assert that the claims are entitled to a priority date that is earlier than the above date.

Dated: [~~May 18~~]**October 26**, 2021

RESPECTFULLY SUBMITTED,

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Attorneys for Plaintiff WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT

CERTIFICATE OF SERVICE

A true and correct copy of the foregoing instrument was served or delivered electronically to all counsel of record, on this [~~18~~]**26**th day of [~~May~~]**October**, 2021.

/s/ Jonathan K. Waldrop
Jonathan K. Waldrop

Exhibit 1 to
WSOU Investments, LLC's
Amended Preliminary Infringement Contentions

Infringement Claim Chart of U.S. Patent No. 9,231,746 (the "Asserted Patent")

The Accused Instrumentalities include, without limitation, OnePlus Technology (Shenzhen) Co., Ltd. ("OnePlus" or "Defendant"), OnePlus 8 Series Phones (i.e., OnePlus 8 Pro and OnePlus 8) implementing 5G capabilities; all past, current and future OnePlus products and services that operate in the same or substantially similar manner as the specifically identified products and services; and all past, current and future OnePlus products and services that have the same or substantially similar features as the specifically identified products and services.

WSOU Investments, LLC ("WSOU" or "Plaintiff") contends that OnePlus, including OnePlus's employees, directly infringes each of the Asserted Claims, either literally or under the doctrine of equivalents. WSOU also contends that OnePlus has indirectly infringed and continues to indirectly infringe by contributing to and actively inducing infringement of one or more of the Asserted Claims.

WSOU does not intend this exemplary claim chart to be limiting, and WSOU reserves its rights to pursue other accused instrumentalities, patent claims, evidence, and infringement arguments in this case.

Exhibit(s)	Description	Link
Exhibit A	OnePlus 8 Pro Specifications	https://www.oneplus.com/8-pro/specs
Exhibit B	OnePlus 8 Series	https://www.oneplus.com/8?from=head
Exhibit C	Qualcomm Document on 3GPP Release 15	https://www.qualcomm.com/media/documents/files/making-5g-nr-a-commercial-reality.pdf,
Exhibit D	3GPP Standard TS 38.212 V 15.8.0	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf
Exhibit E	3GPP Standard TS 38.214 V 15.2.0	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf

Exhibit F	Multi-Level Polar coded Modulation	https://pdfs.semanticscholar.org/66a3/6dde3024c2af110bd33fccdc2872e620a6c2.pdf
Exhibit G	3GPP Standard TS 38.300 V 15.9.0	https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/15.09.00_60/ts_138300v150900p.pdf
Exhibit H	Polar Codes	https://medium.com/5g-nr/polar-codes-703336e9f26b
Exhibit I	3GPP Standard TS 38.212 V 15.2.0	https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.02.00_60/ts_138212v150200p.pdf
Exhibit J	Public Template Qualcomm	https://www.qualcomm.com/media/documents/files/enabling-the-rise-of-the-smartphone-chronicling-the-developmental-history-at-qualcomm.pdf
Exhibit K	Implementation and evaluation of Polar Codes in 5G	http://www.diva-portal.org/smash/get/diva2:1323867/FULLTEXT01.pdf
Exhibit L	Snapdragon 865 5G Mobile Platform	https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform

Claims	OnePlus 8 and 8 Pro (The accused products)

1Pre. A method of transmitting channel information for link adaptation of a radio channel in a wireless network, the method comprising:	The accused products practice a method of transmitting channel information for link adaptation of a radio channel in a wireless network, the method comprising: OnePlus 8 series mobile devices (i.e., OnePlus 8 Pro and OnePlus 8) are the latest releases of OnePlus that support 5G technology in their devices. The Mobile devices comprises of 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 5G RF Modem system for transmission of signals (i.e. Channel Information), as shown in Fig. 2 and Fig. 3. For representative purpose, specification from OnePlus 8 pro model is shown in Fig. 1.

Citation 1: OnePlus 8 Pro

Fig. 1

Source: https://www.oneplus.com/8-pro/specs, Page 1, Last Accessed 28th April 2021, Exhibit A

Citation 2: OnePlus 8 Pro Specifications

Performance

Operating System: OxygenOS based on Android™ 10
CPU: Qualcomm® Snapdragon™ 865
5G Chipset: X55
GPU: Adreno 650
RAM: 8GB/12GB LPDDR5
Storage: 128GB/256GB UFS 3.0 2-LANE
Battery: 4510 mAh (non-removable)
Warp Charge 30T Fast Charging (5V/6A)
30W Wireless Charging

865
Qualcomm
snapdragon

Fig. 2

Source: https://www.oneplus.com/8-pro/specs, Page 2, Last Accessed 28th April 2021, Exhibit A

Citation 3: OnePlus 8 Specifications

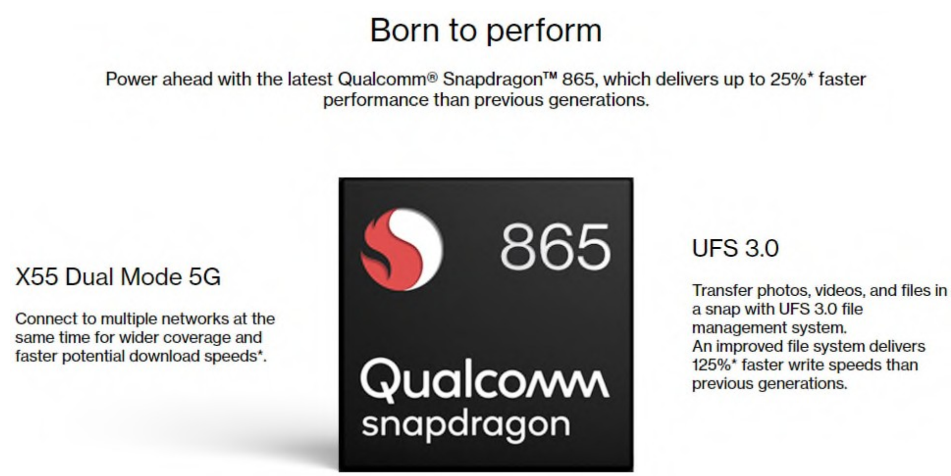


Fig. 3

Source: https://www.oneplus.com/8?from=head, Page 7, Last Accessed 28th April 2021, Exhibit B

Qualcomm Snapdragon 865 processor along with X55 RF modem [~~functions on~~]**implements** the 3GPP release 15 specifications [~~of 5G technology such~~]**that includes** as CRC-Aided Polar coding scheme[~~.~~] **of 5G technology. The accused product (i.e., UE) embedded with X55** RF modem uses Advanced Channel coding technology such as polar coding scheme (support large data blocks and reliable control channel) for transmitting channel information[~~ from User Equipment (UE)~~] to Base Station as shown in Fig. 4.

Citation 4: Advanced channel Coding Scheme in 5G Processor

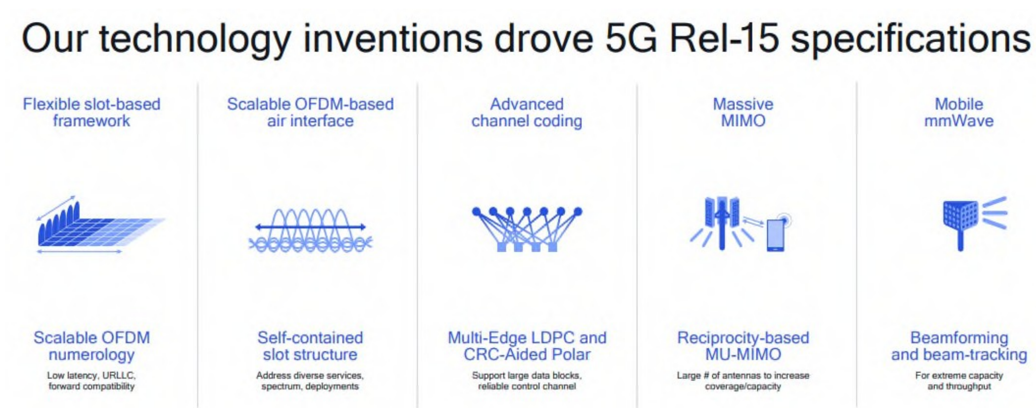


Fig. 4

Source: https://www.qualcomm.com/media/documents/files/making-5g-nr-a-commercial-reality.pdf, Page 13, Last Accessed on 28th April 2021, Exhibit C

According to the 3GPP [~~standard, ~~]TS [~~38.212 (i.e. shown in Fig. 5)~~]**38.212 5G NR Rel-15 specification,** Uplink control information (UCI) uses Physical Uplink Control Channel (PUCCH), **and** Physical Uplink Shared Channel (PUSCH) for the transmission of channel information [~~which~~]**(i.e., channel state information). See Fig. 5. The channel state information (CSI)** consists of Channel Quality Index (CQI), Precoding Matrix Index (PMI) and Rank Indicator (RI) for link adaptation as shown in Fig. 6.

	Citation 5: Physical Channel and Control Information

Table 4.1-2

Control information	Physical Channel
UCI	PUCCH, PUSCH

Table 5.3-2: Usage of channel coding scheme for control information

Control Information	Coding scheme
DCI	Polar code
UCI	Block code
	Polar code

Fig. 5

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf, Page 10 and 13, Last Accessed on 28th April 2021, Exhibit D

Citation 6: CSI reporting

5.2 UE procedure for reporting channel state information (CSI)

5.2.1 Channel state information framework

The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI) and/or L1-RSRP.

Fig. 6

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 1, Last Accessed on 28th April 2021, Exhibit E

Link adaptation is the ability to adapt the various modulation schemes and the coding rate for the error correction according to the quality of the radio link which is sent by the UE to the base station in the form of CSI framework as referred in Fig. 7 & Fig. 8.

In wireless communications, [~~Link~~]**link** adaptation, comprising adaptive coding and modulation (ACM) that is used to denote the matching of the modulation, coding and other signal and protocol parameters to the conditions on the radio link (e.g., the pathloss, the interference due to signals coming from other transmitters, the sensitivity of the receiver, the available transmitter power margin, etc.).

Citation 7: CSI framework

5.2.1 Channel state information framework

The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI) and/or L1-RSRP.

Fig. 7

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 31, Last Accessed on 28th April 2021, Exhibit E

Citation 8: Link Adaptation according to 3GPP Standard

5.2.5 Physical layer procedures

5.2.5.1 Link adaptation

Link adaptation (AMC: adaptive modulation and coding) with various modulation schemes and channel coding rates is applied to the PDSCH. The same coding and modulation is applied to all groups of resource blocks belonging to the same L2 PDU scheduled to one user within one transmission duration and within a MIMO codeword.

For channel state estimation purposes, the UE may be configured to measure CSI-RS and estimate the downlink channel state based on the CSI-RS measurements. The UE feeds the estimated channel state back to the gNB to be used in link adaptation.

Fig. 8

Source: https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/15.09.00_60/ts_138300v150900p.pdf, Page 22, Last Accessed on 28th April 2021, Exhibit G

5G RF Modem supports Link adaptation technology and[~~ this 5G RF modem~~] uses Advanced Channel coding technology such as polar coding scheme (support large data blocks and reliable control channel) for transmitting channel information from User Equipment (UE) to Base Station. See Fig. 9.

Citation 9: Fast Link adaptation

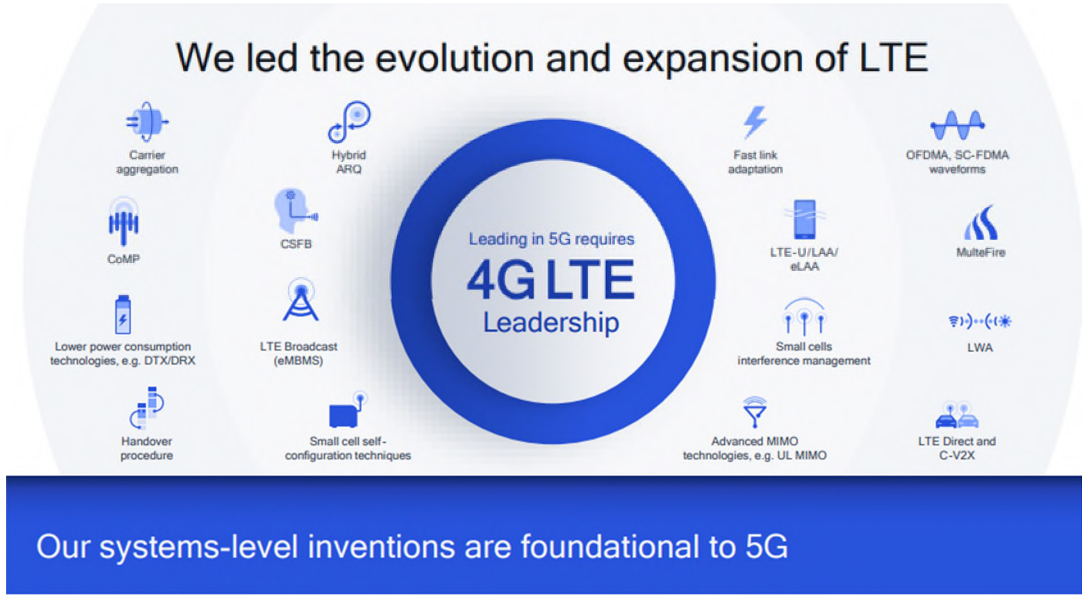


Fig. 9

Source: https://www.qualcomm.com/media/documents/files/enabling-the-rise-of-the-smartphone-chronicling-the-developmental-history-at-qualcomm.pdf, Page no 21 , Last Accessed on 28th April 2021, Exhibit J

1a. encoding the channel information using multi-level coding, said multi-level coding comprising combining multiple bit sequences, each bit sequence corresponding to a coding level of said multi-level coding; and	The method practiced by the accused products comprises encoding the channel information using multi-level coding, said multi-level coding comprising combining multiple bit sequences, each bit sequence corresponding to a coding level of said multi-level coding. OnePlus 8 series mobile devices that support Snapdragon X55 RF modem uses an advanced channel coding scheme, which is the combination of error detection, error-correcting, rate matching, interleaving, and transport channel or control information mapping onto/splitting from physical channels. (Refer Fig. 10). **Citation 10: Channel coding Scheme in 3GPP Standard** 5 General procedures Data and control streams from/to MAC layer are encoded /decoded to offer transport and control services over the radio transmission link. Channel coding scheme is a combination of error detection, error correcting, rate matching, interleaving and transport channel or control information mapping onto/splitting from physical channels. Fig. 10 Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf, Page 10, Last Accessed on 28th April 2021, Exhibit D **Polar codes (i.e., multi-level coding) are one of the channel coding schemes as the error-correcting code on the 5G NR control channels. Polar code has a unique feature of splitting the channel into good and bad bit- channels as shown in Fig. 11.**

[~~Polar codes (i.e., multi-level coding) are one of the channel coding schemes which uses as the error-correcting code on the 5G NR control channels. Polar code has a unique feature of splitting the channel into good and bad bit-channels as shown in Fig. 11.~~]

Citation 11: Polar Codes

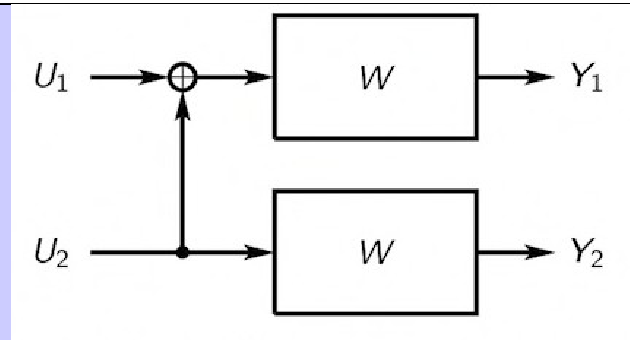
> 3GPP has selected polar codes as the error correcting code on the 5G NR control channels. Polar codes are unique in the way they split the channel into good and bad bit-channels. We will learn about the channel splitting by

Fig. 11

Source: https://medium.com/5g-nr/polar-codes-703336e9f26b, Page 1, Last Accessed on 28th April 2021, Exhibit H

Polar code encoding polarizes the channel into reliable and unreliable bit-channels. The information bits [~~is~~] **are** transmitted on the most reliable channels and the rest of the bits are transmitted on unreliable channels. In general, each coding level is related to the level of detection probability (0.09, 0.51 etc.) for the bit sequence (**e.g.,** u1, u2 etc**, of Fig. 12**). The detection probability is based on the receiver's level of decoding the bit sequence correctly as shown in Fig. 12 and Fig. 13.

Citation 12: Probability Detection



Connecting the two-channel as shown above polarizes the output

Now let's turn our attention to the **W⁺** channel. The channel reconstructs the input received on the U2 channel. With a BEC channel, we have the following possibilities:

- Both channels are successfully decoded — probability $\mathbf{(1\text{-}p)^2}$
- The first channel is erased but the second one is decoded successfully — probability **p(1-p)**
- The first channel is decoded successfully but the second channel is erased — probability **(1-p)p**
- Both channels are erased — probability $\mathbf{p^2}$

Now let's turn our attention to the **W+** channel. The channel reconstructs the input received on the U2 channel. With a BEC channel, we have the following possibilities:

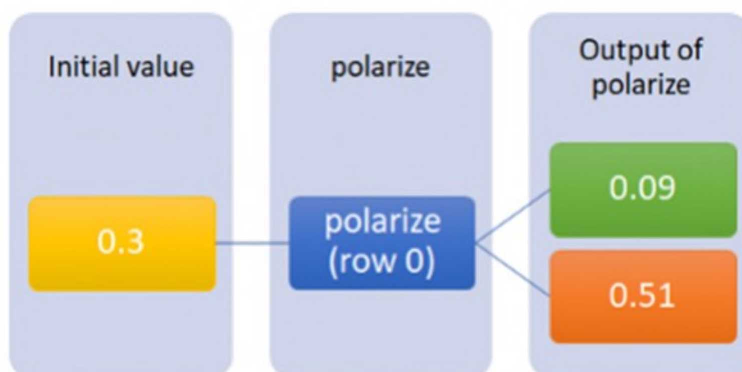
- Both channels are successfully decoded — probability **(1-p)²**
- The first channel is erased but the second one is decoded successfully — probability **p(1-p)**
- The first channel is decoded successfully but the second channel is erased — probability **(1-p)p**
- Both channels are erased — probability **p²**

Fig. 12

Source: https://medium.com/5g-nr/polar-codes-703336e9f26b, Page 2,3 and 4, Last Accessed on 28th April 2021, Exhibit H

Citation 13: Polarized script

The polarize script can be visualized as shown below.



Visualization of the "polarize" script

Fig. 13

Source: https://medium.com/5g-nr/polar-codes-703336e9f26b, Page 8, Last Accessed on 28th April 2021, Exhibit H

Before the encoding process, the two parts of the CSI report generates the UCI bit [~~sequence and these bits sequence~~]**sequences. The bit sequences** further undergo for encoding process with the aid of U vector (U_1, U_2, ..,etc.**of Fig. 15**). See Fig. 14.

Citation 14: Generation of the two UCI bit sequence

If at least one of the CSI reports for transmission on a PUCCH is of two parts, two UCI bit sequences are generated, $a_0^{(1)}, a_1^{(1)}, a_2^{(1)}, a_3^{(1)}, ..., a_{A^{(1)}-1}^{(1)}$ and $a_0^{(2)}, a_1^{(2)}, a_2^{(2)}, a_3^{(2)}, ..., a_{A^{(2)}-1}^{(2)}$. The CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.1.1.2-13, are mapped to the UCI bit sequence $a_0^{(1)}, a_1^{(1)}, a_2^{(1)}, a_3^{(1)}, ..., a_{A^{(1)}-1}^{(1)}$ starting with $a_0^{(1)}$. The CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.1.1.2-14, are mapped to the UCI bit sequence $a_0^{(2)}, a_1^{(2)}, a_2^{(2)}, a_3^{(2)}, ..., a_{A^{(2)}-1}^{(2)}$ starting with $a_0^{(2)}$. If the length of UCI bit sequence $a_0^{(2)}, a_1^{(2)}, a_2^{(2)}, a_3^{(2)}, ..., a_{A^{(2)}-1}^{(2)}$ is less than 3 bits, zeros shall be appended to the UCI bit sequence until its length equals 3.

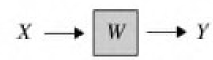
Fig. 14

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.02.00_60/ts_138212v150200p.pdf, Page 50, Last Accessed on 28th April 2021, Exhibit I

In polar encoding process, the transmission is denoted as (N, K), where K is the length of the message and N>K, N is denoted as 2^n where n = 2,3, …, 10 which forms a vector (u) that comprises of length of N bits (bit sequence). See Fig. 15.

Citation 15: Polar Encoding

Polar encoding is to take W, see figure 3.4, and make N copies that are combined and split into different virtual channels, see figure 3.5. The virtual channels are either "noiseless" or completely "noisy" channels [1]. The noise which is referred to is the information which is added from other channels, see figure 3.6 where U_1 is considered more noisy than U_2. The more channels that are polarised the larger the gap between the noiseless and noisy channels becomes. The combination of virtual channels is done by using a Kronecker



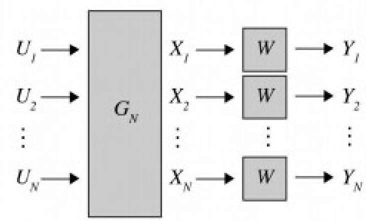


Figure 3.5: Polarisation of W into N virtual channels, U_n: input bit, G_n: see equation 3.5, X_n: bit after encoding, Y_n: received bit

product of the matrix G_2, see expression 3.3, where the rows of the matrix represents the

Fig. 15

	Source: http://www.diva-portal.org/smash/get/diva2:1323867/FULLTEXT01.pdf, Page 17, Last Accessed on 28th April 2021, Exhibit K The remaining N-K bits are called frozen bits with a set value of 0. The vector u can be noisy (low priority) or noiseless (high priority). The vector u is mapped to the channels according to a reliability sequence. The frozen bits are placed on the least reliable channels, called frozen positions and the information bits are placed in the most reliable channels, called information positions. Then, the combining of virtual channel is done by using a Kronecker product of the matrix G_N. After the channels are combined, the output from the encoder is a code-word denoted as vector d, where $d = uG_n \bmod 2$. [~~Therefore, the combining of channels (which consists of~~]**The** frozen bit sequences and information bit sequences[~~) is equivalent to~~] **are combined (e.g.,** combining multiple bit sequences**) to transmit through the channels**. See Fig. 16 and Fig. 17.

Citation 16: Mapping of U vector to the channels

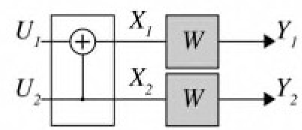


Figure 3.6: Polarisation of W using G_2

transmission is denoted as (N, K), where K = length of the message and $N > K$, $N = 2^n$, $n = 2, 3, ..., 10$ which forms a vector u of length N bits. The remaining $N-K$ bits are called frozen bits with a set value of 0. The u vector is then mapped to the channels according to a reliability sequence. The frozen bits are placed on the least reliable channels, called frozen positions and the information bits are placed in the most reliable channels, called information positions. After the channels are combined, the output from the encoder is a code-word denoted as vector d, where $d = uG_n \mod 2$.

Fig. 16

Source: http://www.diva-portal.org/smash/get/diva2:1323867/FULLTEXT01.pdf, Page 32, Last Accessed on 28th April 2021, Exhibit K

Further**,** in polar coding, the number of encoding levels corresponds to the number of information bit[~~s-sequence~~]**- sequences** (such as u1, u2 etc.). For example, for 8[~~-~~]bit[~~-sequence~~]**-sequences** (u1,u2. u8), there will be 8 encoding levels.

Citation 17: Polar Code Encoding Process

The first part of Fig. 2.4 illustrates how a polar codeword with $N = 8$ by step-wise applying of polar transform $\mathbf{F}_p$ is constructed. Here, the information set and frozen set are $\{u_4, u_6, u_7, u_8\}$ and $\{u_1, u_2, u_3, u_5\}$, respectively.

To encode the polar codes, the kernel (2.7) is applied in n consecutive steps to construct a codeword of length $N = 2^n$ and since in each step, each bit is involved in one operation, the total encoding complexity is of order $O(Nn)$ for implementation of $\mathbf{F}_p^{\otimes n}$ [1]. This low encoding complexity is, in fact, one of the advantages of polar

In polar coding, the number of encoding levels corresponds to the number of information bits[~~-sequence~~]-sequences (such as u1, u2 etc.). For example, for 8[-]bit[~~-sequence~~]-sequences (u1,u2....u8), there will be 8 encoding levels. See Fig. 17.

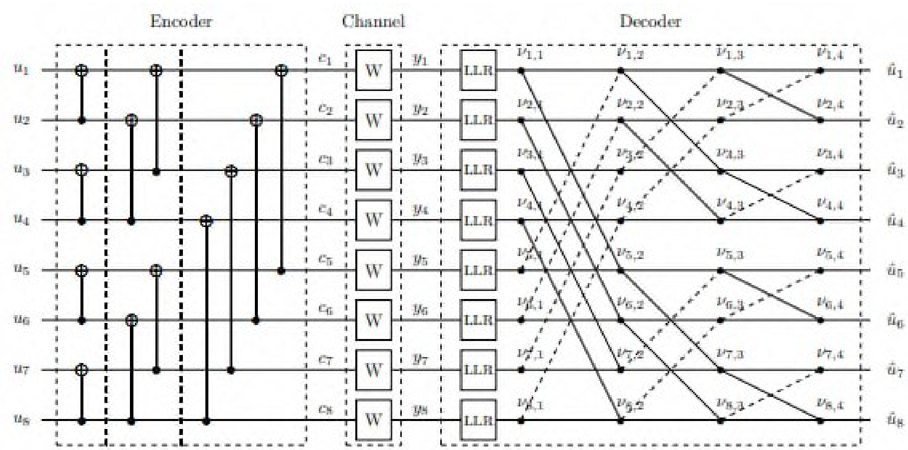
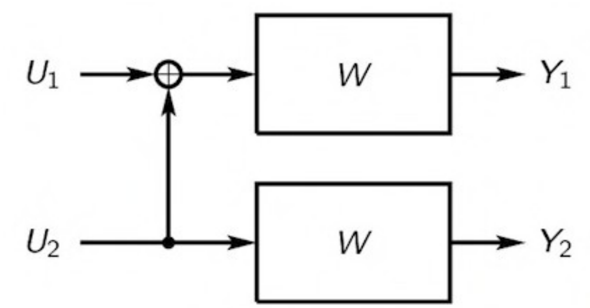


Figure 2.4: Polar encoder and decoder.

Fig. 17

	Source: https://pdfs.semanticscholar.org/66a3/6dde3024c2af110bd33fccdc2872e620a6c2.pdf, Page 42, Last Accessed on 28th April 2021, Exhibit F
1b. assigning one of said coding levels to at least a part of the channel information such that the at least a part of the channel information corresponds to the bit sequence of that coding level; **1c.** wherein the method comprises subdividing the channel information into multiple parts of channel information according to an importance of parts of[~~-channel information for~~]	The accused produced practices, assigning one of said coding levels to at least a part of the channel information such that the at least a part of the channel information corresponds to the bit sequence of that coding level; OnePlus 8 series mobile devices with snapdragon 5G modem has polar encoding feature, [~~Polar code~~]**polar** encoding polarizes the channel into reliable (higher importance) and unreliable bit-channels (lower importance) based on detection probability. The information [~~bits~~]**bit sequence**(such as u1) will be transmitted on the most reliable channels and the rest of the bits are transmitted on unreliable channels. [~~Here~~] **Further,** every coding level is relating to the level of detection probability of the bit sequence as shown in Fig. 18. **Citation 18: Probability Detection**  Connecting the two-channel as shown above polarizes the output

channel information for the link adaptation and assigning one of said coding levels to at least one part of said multiple parts.	The **W⁻** channel tries to reconstruct the input received on the U1 channel. The following possibilities exist when the W channel is modeled as a BEC: • Both channels are successfully decoded — probability **$(1\text{-}p)^2$** • The first channel is erased but the second one is decoded successfully — probability **p(1-p)** • The first channel is decoded successfully but the second channel is erased — probability **(1-p)p** • Both channels are erased — probability **p^2** Now let's turn our attention to the **W⁺** channel. The channel reconstructs the input received on the U2 channel. With a BEC channel, we have the following possibilities: • Both channels are successfully decoded — probability **$(1\text{-}p)^2$** • The first channel is erased but the second one is decoded successfully — probability **p(1-p)** • The first channel is decoded successfully but the second channel is erased — probability **(1-p)p** • Both channels are erased — probability **p^2** Fig. 18 Sourcehttps://medium.com/5g-nr/polar-codes-703336e9f26b, Page 2,3 and 4, Last Accessed on 28th April 2021, Exhibit H In polar coding **(encoding and decoding)**, the number of encoding levels corresponds to the number of information bits sequence (such as u1, u2 etc.). For example, for 8-bit sequence (u1,u2. .....u8), there will be 8 encoding levels as shown in Fig. 19 and Fig. 20.

	Citation 19: Polar Code Encoding Process

The first part of Fig. 2.4 illustrates how a polar codeword with $N = 8$ by step-wise applying of polar transform $\mathbf{F}_p$ is constructed. Here, the information set and frozen set are $\{u_4, u_6, u_7, u_8\}$ and $\{u_1, u_2, u_3, u_5\}$, respectively.

To encode the polar codes, the kernel (2.7) is applied in n consecutive steps to construct a codeword of length $N = 2^n$ and since in each step, each bit is involved in one operation, the total encoding complexity is of order $O(Nn)$ for implementation of $\mathbf{F}_p^{\otimes n}$ [1]. This low encoding complexity is, in fact, one of the advantages of polar

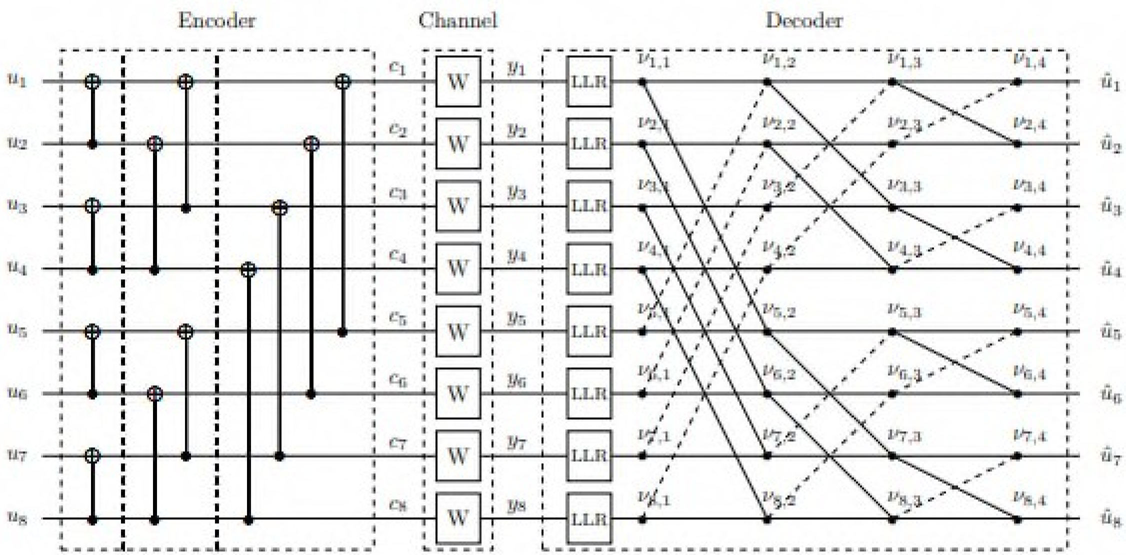


Figure 2.4: Polar encoder and decoder.

Fig. 19

Source:https://pdfs.semanticscholar.org/66a3/6dde3024c2af110bd33fccdc2872e620a6c2.pdf, Page 42, Last Accessed on 28th April 2021, Exhibit F

Citation 20: Splitting and assignment of information bits to coding level (3GPP Standard)

5.3.1 Polar coding

The bit sequence input for a given code block to channel coding is denoted by $c_0, c_1, c_2, c_3, ..., c_{K-1}$, where K is the number of bits to encode. After encoding the bits are denoted by $d_0, d_1, d_2, ..., d_{N-1}$, where $N = 2^n$ and the value of n is determined by the following:

5.3.1.1 Interleaving

The bit sequence $c_0, c_1, c_2, c_3, ..., c_{K-1}$ is interleaved into bit sequence $c'_0, c'_1, c'_2, c'_3, ..., c'_{K-1}$ as follows:

$$c'_k = c_{\Pi(k)}, \; k = 0,1,...,K-1$$

Fig. 20

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf, Page 14 and 26, Last Accessed on 28th April 2021, Exhibit D

The Channel information (i.e., CSI) is divided into the multiple parts such as wideband band CSI and sub-bands CSI (i.e., subdividing the channel information). Wideband CSI always have the highest priority than the sub-bands (i.e., importance of part of channel information). Wideband or sub bands CQI reporting, is **configured by the higher layer parameter. Further, each UCI bit sequence that propagates through the**

[~~configured by the higher layer parameter. Also, each UCI bit sequence~~]**channels associated with coding levels** is mapped (i.e., [~~Assigned~~]**assigned**) to the corresponding CSI report (i.e., a part of the channel information) as shown in Fig. 21 and Fig. 22.

Citation 21: Wideband and Sub-band CSI

- wideband CQI or subband CQI reporting, as configured by the higher layer parameter *cqi-FormatIndicator*. When wideband CQI reporting is configured, a wideband CQI is reported for each codeword for the entire CSI reporting band. When subband CQI reporting is configured, one CQI for each codeword is reported for each subband in the CSI reporting band.

Table 5.2.3-1: Priority reporting levels for Part 2 CSI

Priority 0: Part 2 wideband CSI for CSI reports 1 to N_{Rep}
Priority 1: Part 2 subband CSI of even subbands for CSI report 1
Priority 2: Part 2 subband CSI of odd subbands for CSI report 1
Priority 3: Part 2 subband CSI of even subbands for CSI report 2
Priority 4: Part 2 subband CSI of odd subbands for CSI report 2
⋮
Priority $2N_{\mathrm{Rep}}-1$: Part 2 subband CSI of even subbands for CSI report N_{Rep}
Priority $2N_{\mathrm{Rep}}$: Part 2 subband CSI of odd subbands for CSI report N_{Rep}

Fig. 21

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 35 and 66, Last Accessed on 28th April 2021, Exhibit E

:

Citation 22: Mapping of CSI to UCI bit sequence (assignment)

Table 6.3.1.1.2-14: Mapping order of CSI reports to UCI bit sequence $a_0^{(2)}, a_1^{(2)}, a_2^{(2)}, a_3^{(2)}, \dots, a_{A^{(2)}-1}^{(2)}$, with two-part CSI report(s)

UCI bit sequence	CSI report number
$a_0^{(2)}$ $a_1^{(2)}$ $a_2^{(2)}$ $a_3^{(2)}$ $\vdots$ $a_{A^{(2)}-1}^{(2)}$	CSI report #1, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #1
	CSI report #2, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #2
	...
	CSI report #n, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #n
	CSI report #1, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #1
	CSI report #2, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #2
	...
	CSI report #n, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #n

Fig. 22

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf, Page 52, Last Accessed on 18th May, 2021, Exhibit D

2. The method according to claim 1,	The method practiced by the accused products comprises assigning multiple coding levels to multiple parts of the channel information, a detection probability of the coding level assigned to at least one of said multiple

wherein the method comprises assigning multiple coding levels to multiple parts of the channel information, a detection probability of the coding level assigned to at least one of said multiple parts being higher than the detection probability of the coding level assigned to any further part of said multiple parts having a lower importance with respect to link adaptation than said at least one part.	parts being higher than the detection probability of the coding level assigned to any further part of said multiple parts having a lower importance with respect to link adaptation than said at least one part. **The accused product (**OnePlus 8 series mobile devices**)** with snapdragon 5G **X55 RF** modem [~~has~~]**supports** polar encoding feature[~~, Polar code~~]**. In polar** encoding polarizes the channel into reliable (higher importance) and unreliable bit- channels (lower importance) based on detection probability. The information [~~bits~~]**bit sequence** (such as u1) will be transmitted on the most reliable channels and the rest of the bits are transmitted on unreliable channels. [~~Here~~]**Further,** every coding level is [~~relating~~]**related** to the level of detection probability of the bit sequence. The probability of detection is based on the bit sequence that is correctly decoded by the receiver as shown in Fig. 18. **Citation 23: Probability Detection**

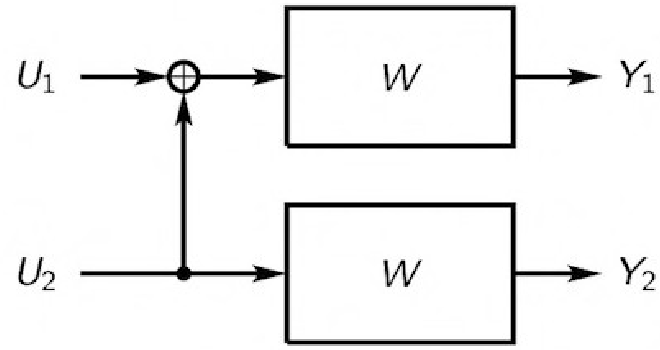
	 Connecting the two-channel as shown above polarizes the output The **W⁻** channel tries to reconstruct the input received on the U1 channel. The following possibilities exist when the W channel is modeled as a BEC: • Both channels are successfully decoded — probability **$(1\text{-}p)^2$** • The first channel is erased but the second one is decoded successfully — probability **p(1-p)** • The first channel is decoded successfully but the second channel is erased — probability **(1-p)p** • Both channels are erased — probability **p^2** Now let's turn our attention to the **W⁺** channel. The channel reconstructs the input received on the U2 channel. With a BEC channel, we have the following possibilities: • Both channels are successfully decoded — probability **$(1\text{-}p)^2$** • The first channel is erased but the second one is decoded successfully — probability **p(1-p)** • The first channel is decoded successfully but the second channel is erased — probability **(1-p)p** • Both channels are erased — probability **p^2**

	Fig. 23 Source: https://medium.com/5g-nr/polar-codes-703336e9f26b, Page 2, 3 and 4, Last Accessed on 28th April 2021, Exhibit H In polar coding, the number of encoding levels corresponds to the number of information bits[~~-sequence~~]**-sequences** (such as u1, u2 etc.). For example, for 8[~~-~~] bit [~~sequence~~]**sequences** (u1,u2. u8), there will be 8 encoding levels and this multiple coding level can be assigned to multiple parts of the channel information as shown in Fig. 24 and Fig. 25.

Citation 24: Polar Code Encoding Process

The first part of Fig. 2.4 illustrates how a polar codeword with $N = 8$ by step-wise applying of polar transform $\mathbf{F}_p$ is constructed. Here, the information set and frozen set are $\{u_4, u_6, u_7, u_8\}$ and $\{u_1, u_2, u_3, u_5\}$, respectively.

To encode the polar codes, the kernel (2.7) is applied in n consecutive steps to construct a codeword of length $N = 2^n$ and since in each step, each bit is involved in one operation, the total encoding complexity is of order $O(Nn)$ for implementation of $\mathbf{F}_p^{\otimes n}$ [1]. This low encoding complexity is, in fact, one of the advantages of polar

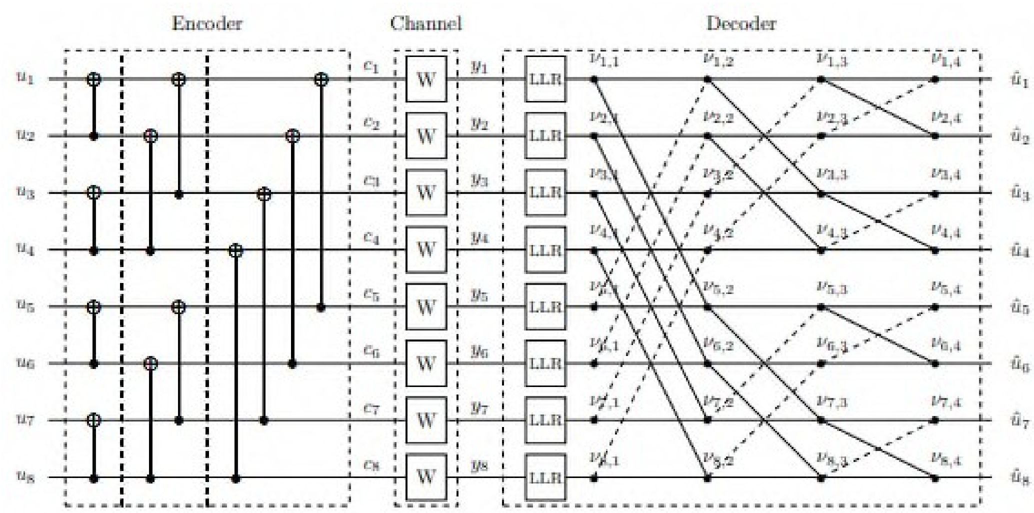


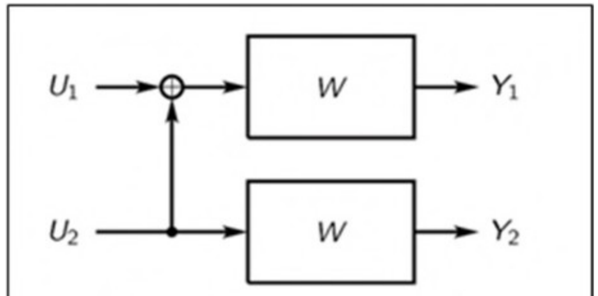
Figure 2.4: Polar encoder and decoder.

Fig. 24

	Source: https://pdfs.semanticscholar.org/66a3/6dde3024c2af110bd33fccdc2872e620a6c2.pdf, Page 42, Last Accessed on 28th April 2021, Exhibit F **Citation 25: Splitting and assignment of information bits to coding level (3GPP Standard)** 5.3.1 Polar coding The bit sequence input for a given code block to channel coding is denoted by $c_0, c_1, c_2, c_3, ..., c_{K-1}$, where K is the number of bits to encode. After encoding the bits are denoted by $d_0, d_1, d_2, ..., d_{N-1}$, where $N = 2^n$ and the value of n is determined by the following: 5.3.1.1 Interleaving The bit sequence $c_0, c_1, c_2, c_3, ..., c_{K-1}$ is interleaved into bit sequence $c'_0, c'_1, c'_2, c'_3, ..., c'_{K-1}$ as follows: $c'_k = c_{\Pi(k)}$, $k = 0,1,...,K-1$ Fig. 25 Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf, Page 14 and 26, Last Accessed on 28th April 2021, Exhibit D
3. The method according to claim 1, wherein the at least one coding level is assigned dynamically to the at least one part of	The accused products practice the method according to claim 1, wherein the at least one coding level is assigned dynamically to the at least one part of channel information according to a momentary importance of parts of channel information in the link adaptation. Polar code encoding polarizes the channel into reliable and unreliable bit-channels. The **UCI bit sequence corresponding to the** information bits [~~will be~~]**are** transmitted on the most reliable channels and the rest of the bits[~~ are transmitted on unreliable channels.~~]

<table>
<tr>
<td>channel information according to a momentary importance of parts of channel information in the link adaptation.</td>
<td>[~~Here~~](e.g., frozen bits) are transmitted on unreliable channels. Further, every coding level is relating to the level of detection probability of the bit sequence. The probability of detection is based on the bit sequence that is correctly decoded by the receiver as shown in Fig. 26.

Citation 26: Probability Detection



Connecting the two-channel as shown above polarizes the output

The W⁻ channel tries to reconstruct the input received on the U1 channel. The following possibilities exist when the W channel is modeled as a BEC:

• Both channels are successfully decoded — probability $(1\text{-}p)^2$
• The first channel is erased but the second one is decoded successfully — probability p(1-p)
• The first channel is decoded successfully but the second channel is erased — probability (1-p)p
• Both channels are erased — probability p^2</td>
</tr>
</table>

Now let's turn our attention to the **W⁺** channel. The channel reconstructs the input received on the U2 channel. With a BEC channel, we have the following possibilities:

- Both channels are successfully decoded — probability **$(1\text{-}p)^2$**
- The first channel is erased but the second one is decoded successfully — probability **p(1-p)**
- The first channel is decoded successfully but the second channel is erased — probability **(1-p)p**
- Both channels are erased — probability **p^2**

Fig. 26

Source: https://medium.com/5g-nr/polar-codes-703336e9f26b, Page 2,3 and 4, Last Accessed on 28th April 2021, Exhibit H

[~~Here, in~~]**In** polar coding, the number of levels corresponds to the number of bits in each symbol. The total number of [~~encoders~~]**encoding levels** in **the** multilevel polar coding is equal to the [~~number of bits in the sequence~~]**bit sequences**. Every bit sequence comprises of the information and the frozen set of [~~bits~~]**bit sequences** that is the part of the channel information (i.e., CSI). In the encoding process of the polar codes, the polarization of binary kernel is applied in successive steps to construct the codeword and since in each step (i.e. each level), each bit is involved in one operation. Polarization in polar code helps most reliable channel to decode well at decoder side that comprises of most significant bits (MSB) as shown in Fig. 27.

Citation 27: Polar Code Encoding Process

> The first part of Fig. 2.4 illustrates how a polar codeword with $N = 8$ by step-wise applying of polar transform $\mathbf{F}_p$ is constructed. Here, the information set and frozen set are $\{u_4, u_6, u_7, u_8\}$ and $\{u_1, u_2, u_3, u_5\}$, respectively.

> To encode the polar codes, the kernel (2.7) is applied in n consecutive steps to construct a codeword of length $N = 2^n$ and since in each step, each bit is involved in one operation, the total encoding complexity is of order $O(Nn)$ for implementation of $\mathbf{F}_p^{\otimes n}$ [1]. This low encoding complexity is, in fact, one of the advantages of polar

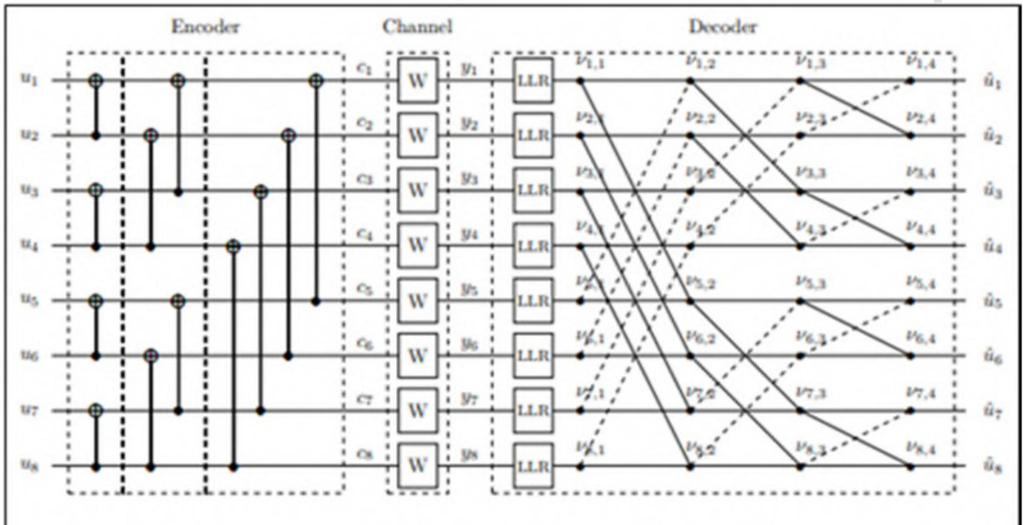


Figure 2.4: Polar encoder and decoder.

Fig. 27

Source: https://pdfs.semanticscholar.org/66a3/6dde3024c2af110bd33fccdc2872e620a6c2.pdf, Page 42, Last Accessed on 28th April 2021, Exhibit G

Channel information (i.e., CSI) is divided into the multiple parts such as wideband band CSI and sub- bands CSI. Wideband CSI always have the highest priority then the sub-bands. Wideband or sub bands CQI reporting, as configured by the higher layer parameter. When wideband CQI reporting is configured, a wideband CQI is reported for each codeword for the entire CSI reporting band. When sub- band CQI reporting is configured, one CQI for each codeword is reported for each sub-band in the CSI reporting band. [~~Hence~~]**Accordingly,** the wideband CSI is of higher importance for the link adaptation then the sub- band CSI (i.e., momentary importance of multiple parts in link adaptation) as shown in Fig. 28 and Fig. 29.

Citation 28: Wideband and Sub-band CSI

- wideband CQI or subband CQI reporting, as configured by the higher layer parameter *cqi-FormatIndicator*. When wideband CQI reporting is configured, a wideband CQI is reported for each codeword for the entire CSI reporting band. When subband CQI reporting is configured, one CQI for each codeword is reported for each subband in the CSI reporting band.

Table 5.2.3-1: Priority reporting levels for Part 2 CSI

Priority 0: Part 2 wideband CSI for CSI reports 1 to N_{Rep}
Priority 1: Part 2 subband CSI of even subbands for CSI report 1
Priority 2: Part 2 subband CSI of odd subbands for CSI report 1
Priority 3: Part 2 subband CSI of even subbands for CSI report 2
Priority 4: Part 2 subband CSI of odd subbands for CSI report 2
⋮
Priority $2N_{\mathrm{Rep}}-1$: Part 2 subband CSI of even subbands for CSI report N_{Rep}
Priority $2N_{\mathrm{Rep}}$: Part 2 subband CSI of odd subbands for CSI report N_{Rep}

Fig. 28

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 35 and 66, Last Accessed on 18th May, 2021, Exhibit E

Citation 29: Mapping of CSI to UCI bit sequence

Table 6.3.1.1.2-14: Mapping order of CSI reports to UCI bit sequence $a_0^{(2)}, a_1^{(2)}, a_2^{(2)}, a_3^{(2)}, ..., a_{A^{(2)}-1}^{(2)}$, with two-part CSI report(s)

UCI bit sequence	CSI report number
$a_0^{(2)}$ $a_1^{(2)}$ $a_2^{(2)}$ $a_3^{(2)}$ $\vdots$ $a_{A^{(2)}-1}^{(2)}$	CSI report #1, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #1
	CSI report #2, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #2
	...
	CSI report #n, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #n
	CSI report #1, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #1
	CSI report #2, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #2
	...
	CSI report #n, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #n

Fig. 29

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.02.00_60/ts_138212v150200p.pdf, Page 51, Last Accessed on 28th April 2021, Exhibit I

5G processor along with RF modem (i.e., transmitter element) in UE ([~~i.~~]e.[~~User equipment~~]**g., the accused product**) is configured

with CSI-ReportConfig reporting settings to report CSI (i.e., CQI) to base station as shown in Fig. 30.

Citation 30: CSI Reporting

5.2 UE procedure for reporting channel state information (CSI)

5.2.1 Channel state information framework

The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI) and/or L1-RSRP.

For CQI, PMI, CRI, SSBRI, LI, RI, L1-RSRP, a UE is configured by higher layers with N≥1 *CSI-ReportConfig* Reporting Settings, M≥1 *CSI-ResourceConfig* Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters *aperiodicTriggerStateList* and *semiPersistentOnPUSCH-TriggerStateList*). Each trigger state in *aperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs for channel and optionally for interference. Each trigger state in *semiPersistentOnPUSCH-TriggerStateList* contains one associated *CSI-ReportConfig*.

Fig. 30

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 32 and 33, Last Accessed on 28th April 2021, Exhibit E

The Reporting Settings enables the UE **(e.g., the accused product)** to configure the part of channel information such as wideband or sub- band (i.e., dynamically to the at least one part of channel information) for the CSI reporting to base station. The reporting timing based on the channel measurement can be set as aperiodic, periodic, semiPersistentinPUSCH, semiPersistentonPUCCH (Physical Uplink Shared Channel). Based on the configured Reporting Settings, the UE dynamically selects the wideband or sub- band. **The** Wideband CQI or sub-band CQI reporting is configured by the higher layer of the parameter as shown in Fig. 31.

	Citation 31: Dynamic Assignment 5.2.1.1 Reporting settings Each Reporting Setting *CSI-ReportConfig* is associated with a single downlink BWP (indicated by higher layer parameter *bwp-Id*) given in the associated *CSI-ResourceConfig* for channel measurement and contains the parameter(s) for one CSI reporting band:codebook configuration including codebook subset restriction, time-domain behavior, frequency granularity for CQI and PMI, measurement restriction configurations, and the CSI-related quantities to be reported by the UE such as the layer indicator (LI), L1-RSRP, CRI, and SSBRI (SSB Resource Indicator). The time domain behavior of the *CSI-ReportConfig* is indicated by the higher layer parameter *reportConfigType* and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For periodic and semiPersistentOnPUCCH/semiPersistentOnPUSCH CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. The higher layer parameter *reportQuantity* indicates the CSI-related or L1-RSRP-related quantities to report. The *reportFreqConfiguration* indicates the reporting granularity in the frequency domain, including the CSI reporting band and if PMI/CQI reporting is wideband or sub-band. The *timeRestrictionForChannelMeasurements* parameter in *CSI-ReportConfig* can be configured to enable time domain restriction for channel measurements and Fig. 31 Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 33, Last Accessed on 28th April 2021, Exhibit E
Claim 4: The method according to claim 1, wherein a first part of said multiple parts of channel information comprises wideband information related to[~~ the whole radio channel~~]	The method practiced by the accused products comprises a first part of said multiple parts of channel information comprises wideband information related to the whole radio channel and a second part of said multiple parts of channel information comprises sub-band information related to at least one sub-band of the radio channel, the first part having a higher importance with respect to the link adaptation than the second part. The Channel information (i.e., CSI) is divided into the multiple parts such as wideband band CSI (i.e., first part) and sub-bands CSI (i.e., second part). **The** Wideband CSI [~~always~~]have the highest priority than the sub- bands[~~ (i.e., first part having higher importance with respect to the link adaptation than the second part).~~]

<table>
<tr>
<td>the whole radio channel and a second part of said multiple parts of channel information comprises sub-band information related to at least one sub-band of the radio channel, the first part having a higher importance with respect to the link adaptation than the second part.</td>
<td>
(i.e., first part having higher importance with respect to the link adaptation than the second part). Wideband or sub bands CQI reporting, is configured by the higher layer parameter. Also, each UCI bit sequence that passes through the channels associated with coding levels is mapped (i.e., [~~Assigned~~] assigned) to the corresponding CSI report (i.e., a part of the channel information) as shown in Fig. 32 and Fig. 33.
Citation 32: Wideband and Sub-band CSI
- wideband CQI or subband CQI reporting, as configured by the higher layer parameter cqi-FormatIndicator. When wideband CQI reporting is configured, a wideband CQI is reported for each codeword for the entire CSI reporting band. When subband CQI reporting is configured, one CQI for each codeword is reported for each subband in the CSI reporting band.
Table 5.2.3-1: Priority reporting levels for Part 2 CSI
<table>
<tr><td>Priority 0:
Part 2 wideband CSI for CSI reports 1 to N_{Rep}</td></tr>
<tr><td>Priority 1:
Part 2 subband CSI of even subbands for CSI report 1</td></tr>
<tr><td>Priority 2:
Part 2 subband CSI of odd subbands for CSI report 1</td></tr>
<tr><td>Priority 3:
Part 2 subband CSI of even subbands for CSI report 2</td></tr>
<tr><td>Priority 4:
Part 2 subband CSI of odd subbands for CSI report 2</td></tr>
<tr><td>⋮</td></tr>
<tr><td>Priority $2N_{\text{Rep}}-1$:
Part 2 subband CSI of even subbands for CSI report N_{Rep}</td></tr>
<tr><td>Priority $2N_{\text{Rep}}$:
Part 2 subband CSI of odd subbands for CSI report N_{Rep}</td></tr>
</table>
Fig. 32
</td>
</tr>
</table>

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 35 and 66, Last Accessed on 28th April 2021, Exhibit E

Citation 33: Mapping of CSI to UCI bit sequence (assignment)

Table 6.3.1.1.2-14: Mapping order of CSI reports to UCI bit sequence $a_0^{(2)}, a_1^{(2)}, a_2^{(2)}, a_3^{(2)}, \ldots, a_{A^{(2)}-1}^{(2)}$, with two-part CSI report(s)

UCI bit sequence	CSI report number
$a_0^{(2)}$ $a_1^{(2)}$ $a_2^{(2)}$ $a_3^{(2)}$ $\vdots$ $a_{A^{(2)}-1}^{(2)}$	CSI report #1, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #1
	CSI report #2, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #2
	...
	CSI report #n, CSI part 2 wideband, as in Table 6.3.1.1.2-10 if CSI part 2 exists for CSI report #n
	CSI report #1, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #1
	CSI report #2, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #2
	...
	CSI report #n, CSI part 2 subband, as in Table 6.3.1.1.2-11 if CSI part 2 exists for CSI report #n

Fig. 33

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138212/15.08.00_60/ts_138212v150800p.pdf, Page 52, Last Accessed on 28th April 2021, Exhibit D

Claim 11pre: A transmitting device including: **11a:** A memory with executable instructions stored thereon; and **11b:** A processor configured to access said memory to execute said executable instructions and to:	The accused product implements a transmitting device including: A memory with executable instructions stored thereon; and A processor configured to access said memory to execute said executable instructions and to: encode the channel information using multi-level coding, said multi-level coding comprising combining multiple bit sequences, each bit sequence corresponding to a coding level of said multi-level coding; and assign one of said coding levels to at least a part of the channel information such that the at least a part of the channel information corresponds to the bit sequence of that coding level. OnePlus 8 series mobile devices (i.e., OnePlus 8 Pro and OnePlus 8) are the latest releases of OnePlus that support 5G technology in their devices. The Mobile devices comprises of 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 5G RF Modem system for transmission of signals (i.e., Channel Information). In this way **OnePlus 8 series mobile devices embedded with** Qualcomm Snapdragon X55 5G RF Modem system acts as transmitting device. [~~There is~~]**The accused product consist of** a memory on which some code or information is stored (executable instructions) and a processor (CPU Cores: Qualcomm)[~~. The processor~~] **that** is configured to access memory to execute the instructions. See Fig. 34 and Fig. 35.

Citation 34: OnePlus 8 Specifications

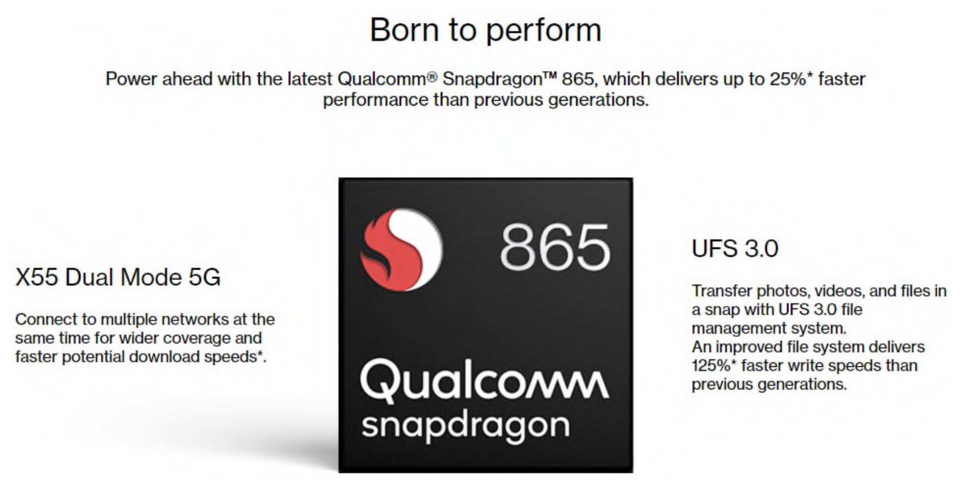


Fig. 34

Source: https://www.oneplus.com/8?from=head, Page 7, Last Accessed 28th April 2021, Exhibit B

Citation 35: Snapdragon 865 Mobile platform

Cellular Modem	**Modem Name:** Qualcomm® Snapdragon™ X55 5G Modem-RF system
CPU	**CPU Clock Speed:** Up to 2.84 GHz **CPU Cores:** Qualcomm® Kryo™ 585 CPU **CPU Architecture:** 64-bit

	Memory Memory speed: 2750MHz Memory Type: 4x16bit, LPDDR5 Fig. 35 Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 2-3, Last Accessed on 28th April 2021, Exhibit D
11c: encode the channel information using multi-level coding, said multi-level coding comprising combining multiple bit sequences, each bit sequence corresponding to a coding level of said multi-level coding; and	*Refer to supporting evidence of claim element 1[a].*
11d: assign one of said coding levels to at least a part of the channel information such that	*Refer to supporting evidence of claim element 1[b].*

the at least a part of the channel information corresponds to the bit sequence of that coding level;	
11e: wherein the transmitting device is further configured to subdivide the channel information into multiple parts of channel information according to an importance of parts of channel information for the link adaptation and assign one of said coding levels to at least one part of said multiple parts.	*Refer to supporting evidence of claim element 1[c].*

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Description	2021-05-18 Preliminary Infringement Contentions (958 Case)
Document 2 ID	file://C:\Users\mp073512\Desktop\2021-10-26 WSOU Amended Preliminary ICs Cover - 958 Case.pdf
Description	2021-10-26 WSOU Amended Preliminary ICs Cover - 958 Case
Rendering set	MLB Set 1

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[~~Deletion~~]	
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Moved to	
Style change	
Format change	
~~Moved deletion~~	
Inserted cell	
Deleted cell	
Moved cell	
Split/Merged cell	
Padding cell	

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Moved to	0
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Total changes	148